Keysight 16034G Test Fixture

Operation Manual

KEYSIGHT TECHNOLOGIES

Notices

Trademark Acknowledgments

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CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Table of Contents

1 Overview

Product Overview

The 16034G is designed for chip type components whose sizes range from 0201 to 1306. This test fixture can take measurements of the chip type L,C,R.

Figure 1-1 Product Overview

Incoming Inspection

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the 16034G has been checked mechanically and electrically. The contents of the shipment should be as listed in Table 1-1. If the contents are incomplete, if there is mechanical damage or defect, notify the nearest Keysight Technologies office. If the shipping container is damaged, or the cushioning material shows signs of unusual stress, notify the carrier as well as the Keysight Technologies office. Keep the shipping materials for the carrier's inspection.

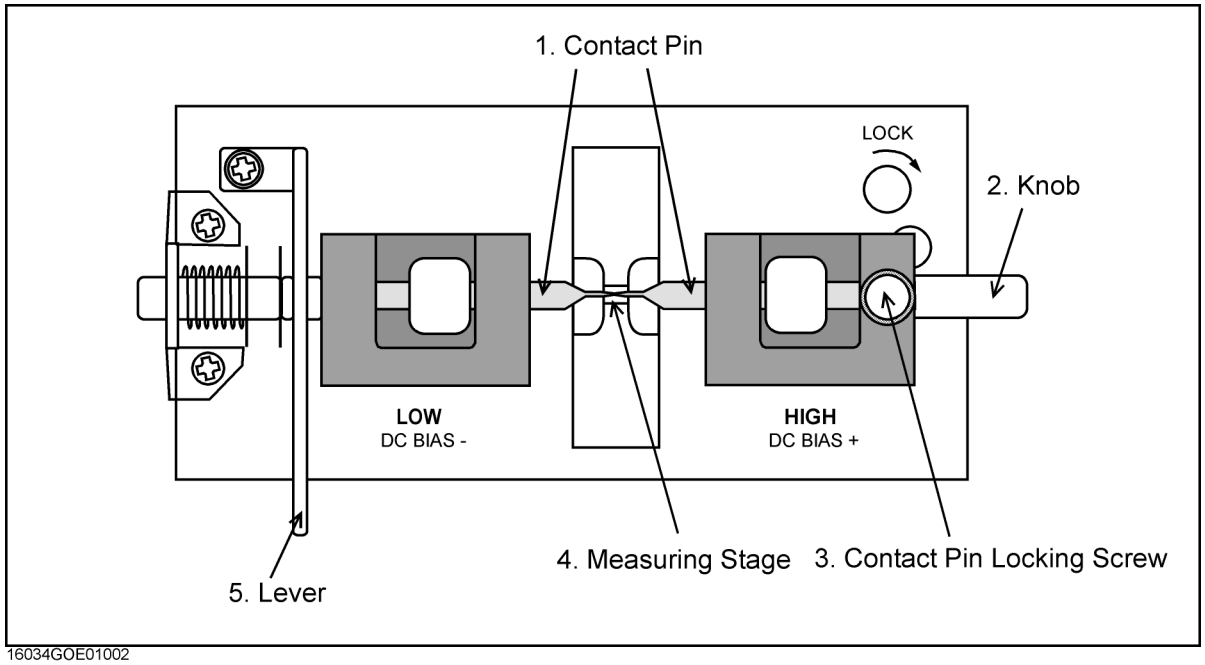
Table 1-1 Contents

Description	Part Number	Qty.
16034G	-	1
100 W SMD Resistance	5012-8812	10
Case for 100 W SMD Resistance	1540-0692	1
Operation Manual	Option ABA[a]	1

a. The manual is furnished only Option ABA is ordered.

Functions

Figure 1-2 16034G Parts



16034GOE01002

No.	Part	FUNCTION
1	Contact Pin	Contact for DUT electrode. LOW side Contact Pin connected to a instrument's L_{CUR}, L_{POT} and HIGH side Contact Pin connected to a instrument's H_{CUR}, H_{POT}.
2	Knob	For lateral adjustment of HIGH side Contact Pin.
3	Contact Pin Locking Screw	For securing HIGH side Contact Pin's position by turning clockwise.
4	Measuring Stage	Where DUT is mounted.
5	Lever	For pulling back Low side Contact Pin before placing DUT between contact pins.

2 Operation

This chapter describes the proper methods for open and short correction and DUT measurement.

Performing Open and Short Correction

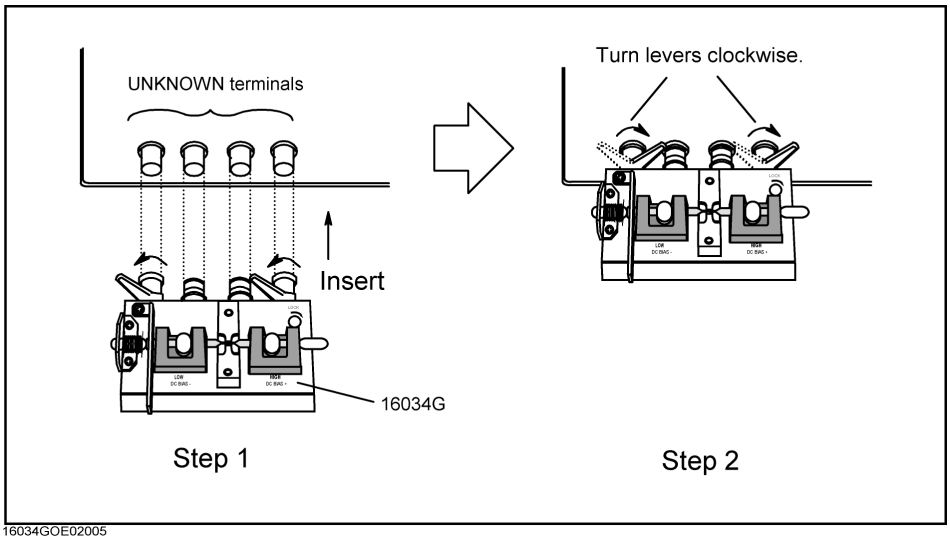
To enhance measurement accuracy, open and short correction should be done before DUT measurement. The following procedure shows correction and measurement by the 16034G.

CAUTION **Take care to avoid rough handling and never allow any mechanical shock to the 16034G, especially against the contact pins from the sides or any to the parts mounted on top of the fixture.**

Connecting the 16034G

1. Set the cable length to 0 m in the instrument.
2. Connect the 16034G directly to the UNKNOWN terminals as shown in Figure 2-1.

Figure 2-1 Connecting the 16034G



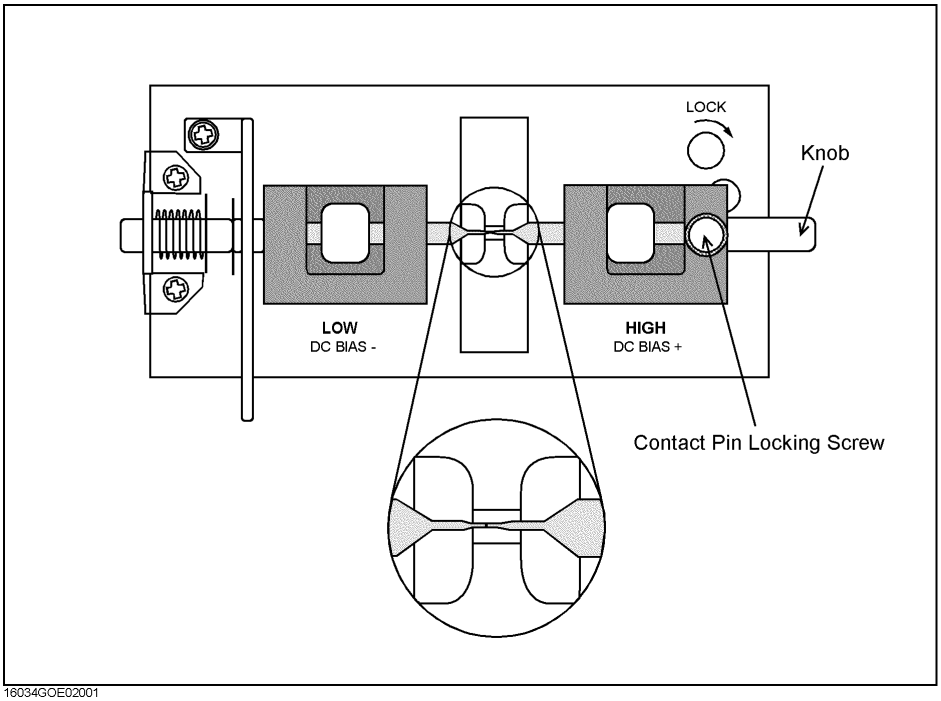
16034GOE02005

Performing Short Correction

The short correction procedure is as follows.

1. Push the HIGH side contact pin's knob to the left to make firm contact with the LOW side contact pin (Figure 2-2). Tighten the contact pin locking screw to secure the HIGH side contact pin.

Figure 2-2 Contact pin position for short correction



16034GOE02001

2. Perform the short correction as described in the specific instrument's manual.

Performing Open Correction

The open correction procedure is as follows.

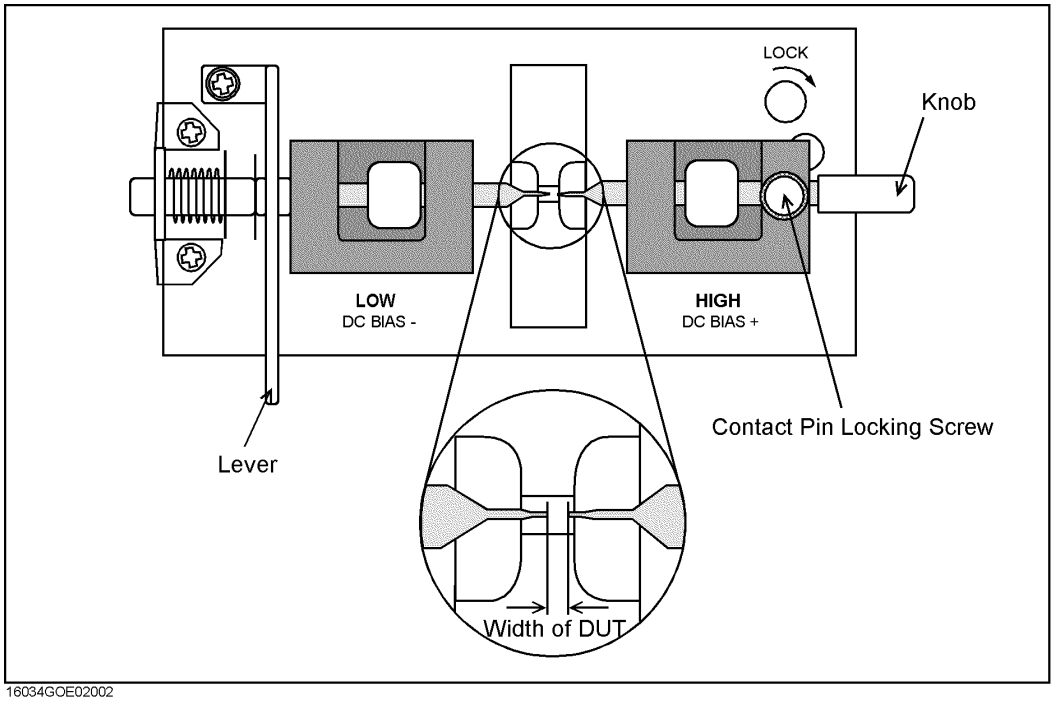
1. Push the HIGH side contact pin so that the distance between the HIGH and the LOW contact pins matches the DUT's width (Figure 2-3).

   It is recommended that you place the DUT on the measuring stage and precisely position the HIGH side contact pin to actual DUT width.

NOTE **Before performing open correction, remove the DUT used for positioning by pulling back the lever to release the LOW side contact pin.**

2. Tighten the contact pin locking screw to secure the HIGH side contact pin.

Figure 2-3 Contact pin position for open correction



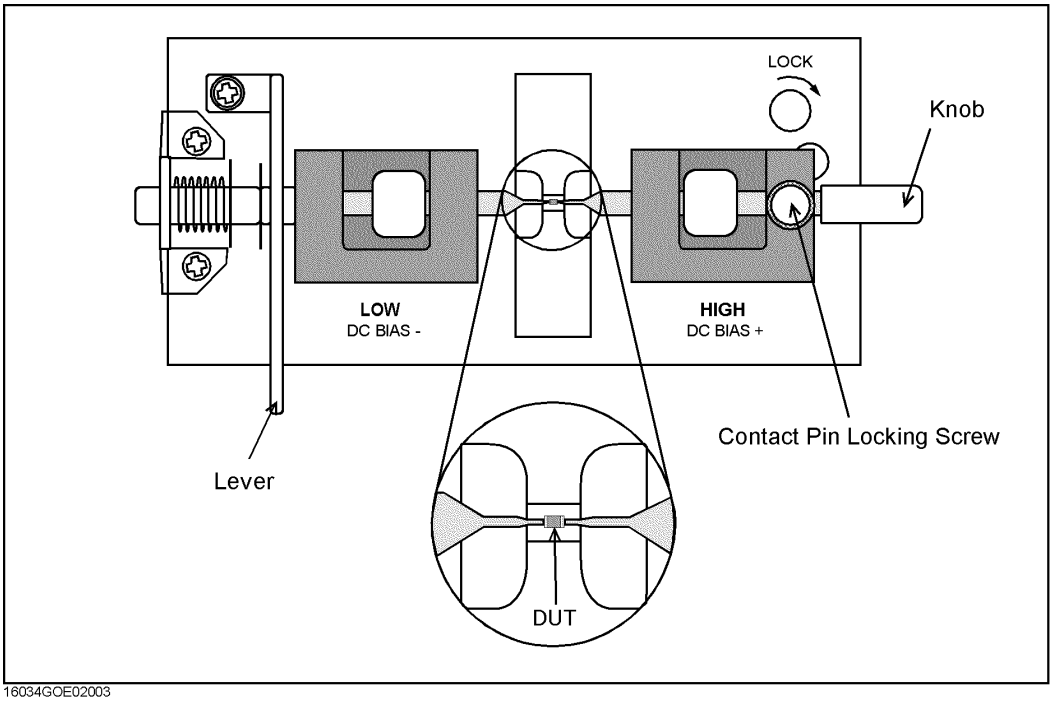
3. Perform the open correction as described in the specific instrument's manual.

DUT Measurement

Before performing DUT measurement, open and short correction should be done as described in the previous sections. If measurement frequency is over 3 MHz, perform load correction before the DUT measurement described later onwards.

1. Adjust the HIGH side contact pin so that the DUT is positioned on the center of the measuring stage and secure the contact pin with the contact pin locking screw.
2. Release the LOW side contact pin with the lever and set the DUT on the measuring stage
3. Ease back slowly on the lever until the LOW side contact pin makes gentle contact with the DUT.

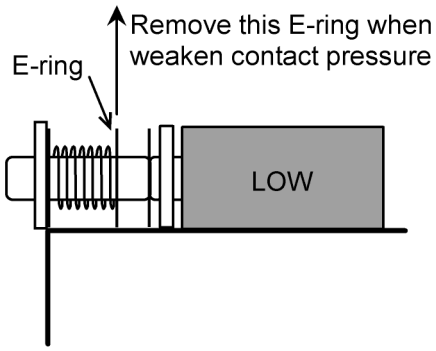
Figure 2-4 Contact pin position for DUT measurement



4. Perform the measurement as described in the specific instrument's manual.
5. To measure the same size DUT repeatedly, simply release the LOW side contact pin with the lever when to changing the DUT without moving the HIGH side contact pin.

NOTE

Measurement values can vary depending on contact pressure when measuring ferrite inductors or multi-layer ceramic capacitors with high permittivity. When measuring this kind of device, removing the E-ring can weaken the spring pre-load. However, this technique may increase contact resistance and thus degrades the accuracy of D parameter measurements.



NOTE

Be sure to keep the contact pins clean at the points where they make contact with DUTs.

DUT measurement over 3 MHz

Before performing DUT measurement over 3 MHz, performing load correction is recommended.

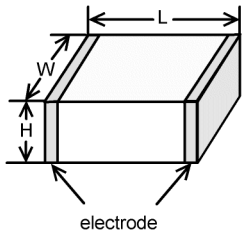
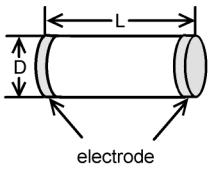
The proportional error factor in the additional error caused by the fixture is in proportion to the frequency squared. Therefore, the error increases greatly as the frequency goes high. To reduce this error, perform load correction.

1. Set the 100 W SMD resistor on the fixture the same way as a DUT measurement, and perform measurement at 3 MHz to determine the value of the 100 W SMD resistor.
2. Set the measured resistance and inductance values to the instrument as load value.
3. Perform load correction.

3 Specifications and Supplemental Performance Characteristics

This chapter provides specifications and supplemental performance characteristics of the 16034G test fixture.

Specifications

Applicable Instruments		LCR meters and impedance analyzers with four-terminals
Applicable DUT Type		Chip components
Applicable DUT dimensions		 0.3 mm ≦ H ≦ 1.6 mm 0.3 mm ≦ W ≦ 1.6 mm 0.1 mm ≦ L ≦ 5.0 mm  0.4 mm ≦ D ≦ 1.6 mm 0.1 mm ≦ L ≦ 5.0 mm
Maximum Voltage		± 42 V peak max. (AC+DC)
Operating Environment	temp.	0°C to +55°C
	humidity	15% to 95%RH (@ wet bulb temp. < 40°C)

Non Operating Environment	temp.	- 40°C to +70°C
	humidity	≤ 90 % RH (@ wet bulb temp. < 65°C)
Dimensions		Approximately 120 (W) x 50 (H) x 70 (D) mm
Weight		Approximately 200 g

Supplemental Performance Characteristics

This section provides useful data on the 16034G. These supplemental performance characteristics should not be considered specifications.

Frequency Range

With OPEN/SHORT correction ≤ 3 MHz

With OPEN/SHORT/LOAD correction ≤ 120 MHz

Additional Errors (With OPEN/SHORT correction)

Additional errors are calculated as follows.

|Z| Measurement

Additional error Ze [%] of the |Z| measurement is calculated by substituting the values in the table below into the following equation.

$Ze\ [\%] = \pm \{A + (Zs/Zx + Yo \times Zx) \times 100\}$

where

A [%]	Additional Error (Proportional Error)
Zs [Ω]	Short Repeatability (Impedance)
Yo [S]	Open Repeatability (Admittance)
Zx [Ω]	Measured Value (Impedance)

Zs	$\{10 + 13 \times (f / 10)\} \times 10^{-3}[\Omega]$
Yo	$\{5 + 500 \times (f / 10)\} \times 10^{-9}[S]$
A	$0.5 \times (f / 10)^2\ [\%]$

where f is frequency (MHz).

D Measurement

Additional error De of the D measurement is calculated by additional error Ze [%] of |Z| measurement as follows.

If $Dx \leq 0.1$:

$$De = Ze / 100$$

If $0.1 < Dx \leq 0.5$:

$$De = (Ze / 100) \times (1 + Dx)$$

where Dx is the measured value of D. It is necessary for Ze to be below 10 %.

NOTE D is not expressed as a percentage but as an absolute value.

Rs (ESR) Measurement

Additional error Rse[%] of the Rs measurement is calculated by additional error Ze [%] of |Z| measurement as follows.

If Dx ≤ 0.1:

$$Rse\,[\%] = Ze / Dx$$

If 0.1 < Dx ≤ 0.5:

$$Rse\,[\%] = (Ze / Dx) \times \sqrt{(1 + Dx^2)}$$

Dx is the measured value of D and is calculated as follows.

$$Dx = 2 \times \pi \times f \times Csx \times Rsx,$$

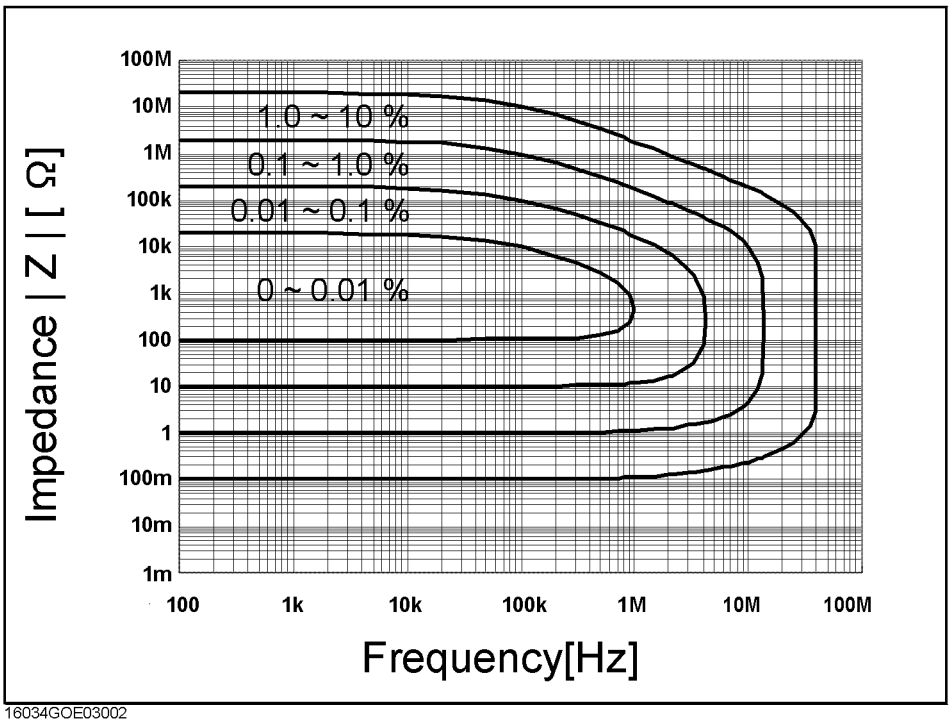
where

f: measurement signal frequency

Csx: measured value of Cs

Rsx: measured value of Rs.

Figure 3-1 Additional Error in |Z| measurement



Contact Pressure

The following data are supplemental performance characteristics for the spring that applies contact pressure.

Spring constant	37 gf/mm ± 10 %
Spring pre-load	Approximately 400 g (without E-ring, approximately 20 g)

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